Welch Allyn GS 777 Wall Transformer

Service manual

Welch Allyn®

Advancing Frontline Care™

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Symbol descriptions

	AC input power
	DC input power
	DC output power
	Separate Waste Electronic and Electrical Equipment (WEEE) from other disposables. Prepare this product for reuse or separate collection as specified by the WEEE Directive 2002/96/EC or local law.
	The product does not contain hazardous substances above threshold values defined in China Standard SJ/T 11363 – 2006. The product is green and environmental and can be recycled after use.
	Illuminated: Power is present. Not illuminated: No power.
	Type BF applied part

Safety

All users of the device must read and understand all safety information presented in this manual before using or repairing the device.

United States federal law restricts this device to sale, distribution, or use by or on the order of a licensed medical practitioner.

General warnings and cautions

WARNING Read and understand the instructions before using this product. Failure to understand the operating requirements for this product can result in injury to you or the patient and can damage the product.

WARNING Explosion hazard. Do not operate this product in the presence of flammable anesthetics or other flammable substances in combination with air, oxygen-enriched environments, or nitrous oxide.

WARNING Electric shock hazard. Do not simultaneously touch the patient and the center metal contact of the handle.

WARNING Do not modify this equipment. Any modification of this equipment can lead to patient injury. Any modification of this equipment voids the product warranty.

WARNING Welch Allyn is not responsible for the integrity of any mounting installation. Welch Allyn recommends that customers contact their Biomedical Engineering Department or maintenance service to ensure professional installation for safety and reliability of any mounting accessory.

Caution As a precaution, avoid using this product in close proximity to other equipment. The product complies with current required standards for electromagnetic interference and should not present problems to other equipment or be affected by other devices.

Caution Only authorized Welch Allyn Service Centers can perform service on this product.

Caution To make sure that the transformer can be unplugged from the AC power source, never block access to the wall socket.

Caution Rx only (for professional use).

Caution Do not autoclave the system. Autoclave accessories only if the manufacturer's instructions clearly approve it.

General safety considerations

- To ensure patient safety, use only accessories recommended or supplied by Welch Allyn. Always use accessories according to your facility's standards and according to the manufacturer's recommendations and instructions. Always follow the manufacturer's directions for use.
- Welch Allyn recommends that only Welch Allyn service personnel or an authorized repair center perform warranty service. Performing unauthorized service on a device that is within warranty may void the warranty.

Electrostatic discharge (ESD)

CAUTION
SENSITIVE ELECTRONIC DEVICES
DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, ELECTROMAGNETIC, MAGNETIC OR RADIOACTIVE FIELDS.

Caution Electrostatic discharge (ESD) can damage or destroy electronic components. Handle static-sensitive components only at static-safe workstation.

Caution Assume that all electrical and electronic components of the device are static-sensitive.

Electrostatic discharge is a sudden current flowing from a charged object to another object or to ground. Electrostatic charges can accumulate on common items such as foam drinking cups, cellophane tape, synthetic clothing, untreated foam packaging material, and untreated plastic bags and work folders, to name only a few.

Electronic components and assemblies, if not properly protected against ESD, can be permanently damaged or destroyed when near or in contact with electrostatically charged objects. When you handle components or assemblies that are not in protective bags and you are not sure whether they are static-sensitive, assume that they are static-sensitive and handle them accordingly.

- Perform all service procedures in a static-protected environment. Always use techniques and equipment designed to protect personnel and equipment from electrostatic discharge.
- Remove static-sensitive components and assemblies from their static-shielding bags only at static-safe workstations—a properly grounded table and grounded floor mat—and only when you are wearing a grounded wrist strap (with a resistor of at least 1 megohm in series) or other grounding device.
- Use only grounded tools when inserting, adjusting, or removing static-sensitive components and assemblies.
- Remove or insert static-sensitive components and assemblies only with device power turned off.
- Insert and seal static-sensitive components and assemblies into their original static-shielding bags before removing them from static-protected areas.
- Always test your ground strap, bench mat, conductive work surface, and ground cord before removing components and assemblies from their protective bags and before beginning any disassembly or assembly procedures.

Overview

Purpose and scope

This service manual is a reference for corrective service procedures for the Welch Allyn GS 777 Wall Transformer. It is intended for use only by trained and qualified service personnel.

Corrective service is supported to the level of field-replaceable units. These include circuit-board assemblies and some subassemblies, case parts, and other parts.

WARNING When performing a service procedure, follow the instructions exactly as presented in this manual. Failure to do so could damage the device, invalidate the product warranty, and lead to serious personal injury.

Caution No component-level repair of circuit boards and subassemblies is supported. Use only the repair procedures described in this manual.

This manual applies only to this device. For servicing of any other device, see the service manual for the specific device.

Service work not described in this manual must be performed by qualified service personnel at the factory or at an authorized Welch Allyn service center.

Technical support services

Welch Allyn offers the following technical support services:

- Telephone support
- Replacement service parts
- Product service

For information on any of these services, call the Welch Allyn Service Center nearest you.

Service options

Warranty service

All repairs on products under warranty must be performed or approved by Welch Allyn. Refer all warranty service to Welch Allyn Product Service or another authorized Welch Allyn Service Center. Obtain a Return Material Authorization (RMA) number for all returns to Welch Allyn Product Service.

Caution Unauthorized repairs will void the product warranty.

Non-warranty service

Welch Allyn product service and authorized service centers support non-warranty repairs. Contact any Welch Allyn regional service center for pricing and service options.

Welch Allyn offers modular repair parts for sale to support non-warranty service. This service must be performed only by qualified end-user biomedical/clinical engineers using this service manual.

Repairs

A Welch Allyn Service Center must perform all repairs on products under warranty.

Caution Unauthorized repairs will void the product warranty.

Qualified service personnel or a Welch Allyn Service Center should repair products out of warranty.

If you are advised to return a product to Welch Allyn for repair or routine maintenance, schedule the repair with the service center nearest you.

Welch Allyn Technical Support

If you have a problem with the device that you cannot resolve, call the Welch Allyn Technical Support Center nearest you for assistance. A representative will assist you in troubleshooting the problem and will make every effort to solve the problem over the phone, avoiding a potential unnecessary return.

If your product requires warranty or non-warranty repair service, a Welch Allyn Technical Support representative will record all necessary information to issue an RMA number. The support representative will provide you with the address of the Welch Allyn Service Center to send your device to.

Technical support is available during local business hours.

Returning products

Note Welch Allyn does not accept returned products without an RMA.

When returning a product to Welch Allyn for service, please include the following information:

- A complete return shipping address.
- A contact name and phone number.
- Any special shipping instructions.
- A purchase-order number or credit-card number if the product is not covered by a warranty.
- A full description of the problem or service request.

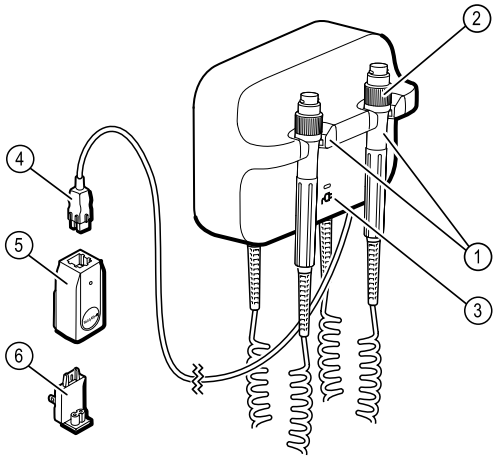
1. Contact Welch Allyn and request a Return Material Authorization number.
2. Ship the device to Welch Allyn, observing these packing guidelines:
   a. Put the system **and a packing list** into the original shipping carton with the original packing materials or into another appropriate shipping carton.

b. Write the Welch Allyn RMA number with the Welch Allyn address on the outside of the shipping carton.

Note To ensure safe receipt of your system by the service center and to expedite processing and return of the system to you,**thoroughly clean all residues from the device before you ship it to Welch Allyn**. For decontamination and cleaning requirements, see "Decontamination and cleaning" in the appendices.
If a returned device is found to be contaminated with bodily fluids, it will be returned at the owner's expense. United States federal regulations prohibit the processing of any device contaminated with blood-borne pathogens. Welch Allyn thoroughly cleans all returned systems on receipt, but any system that cannot be adequately cleaned cannot be repaired.

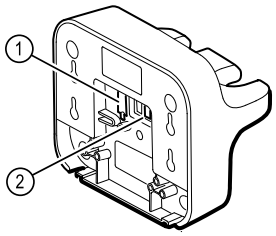
Controls, indicators, and connectors

Front view



No.	Feature	Description
1	Physical assessment instruments - Handles and handle cradles	Handles will accept any 3.5V Welch Allyn instrument head. The handle cradles support using one handle at a time. A handle turns on automatically when you remove it from a cradle and turns off when you return it.
2	Rheostat	Located on each handle. Turn clockwise to increase light output; turn counterclockwise to decrease light output.
3	LED indicator	Indicates power is present.
4	USB power cable	Twin USB power cable
5	5W power supply with LED indicator	5W platform power supply. Indicates power is present.
6	5W adapter plug	Region-specific 5W adapter plug

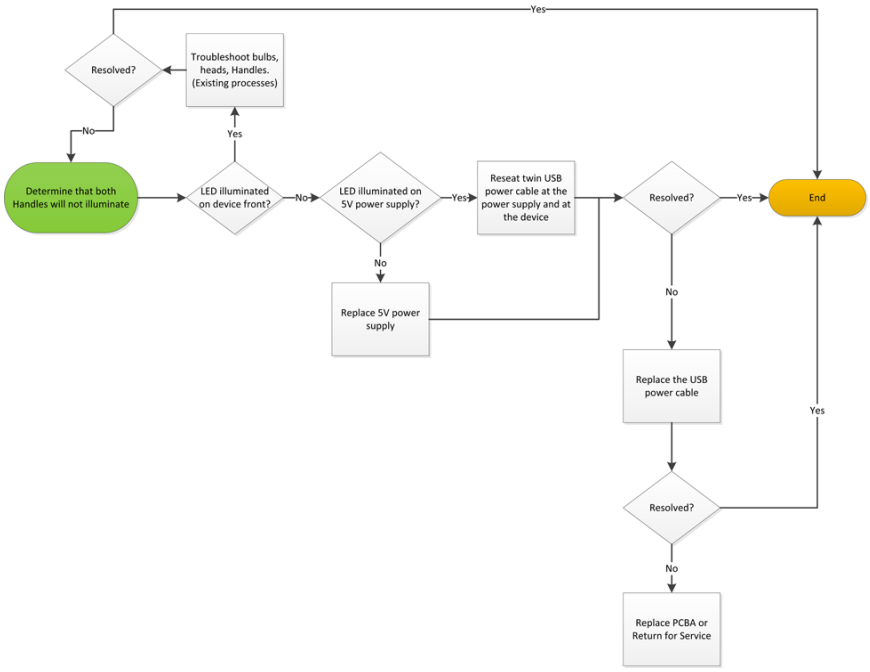
Back view



No.	Feature	Description
1	Host USB mini, power in	5V USB, type "mini". Provides power to the GS 777 Wall Transformer.
2	Host USB, power out	5V USB, type "A". Provides power to other supported Welch Allyn devices.

Troubleshooting

This section provides a process diagram to help you troubleshoot the device. Follow it first and then refer to the accompanying tables.



This section provides the following tables to help you troubleshoot the device.

- **Symptoms and solutions**: These tables list symptoms you might observe, list possible causes, and suggest actions that might eliminate the problem.

These tables can help you diagnose and fix a problem. They do not replace basic troubleshooting skills. You must still trace the source of the problem to the board or module level to decide the best course of action.

Welch Allyn does not support component-level repair to the board or module.

For available replacement parts, see “Field Replaceable Units.”

WARNING Do not perform troubleshooting on a device that is emitting smoke or exhibits other signs of excessive overheating. Disconnect the device from AC power and call Welch Allyn Technical Support immediately.

Caution Replace parts, components, or accessories only with parts supplied or approved by Welch Allyn. The use of any other parts can lead to inferior performance and will void the product warranty.

Symptoms and solutions

Handles

Symptom	Possible cause	Suggested action
The lamp does not illuminate	There is no lamp in the handle head	Install a lamp in the handle head.
	The lamp is burned out	Install a new lamp.
	The other handle is off the cradle	Place the other handle in the cradle.
	The system is not powered up	Power up the system.
	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The lamp is too dim	The rheostat setting is too low	Increase the rheostat setting.
	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The lamp is too bright	The rheostat setting is too high	Decrease the rheostat setting.
	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The lamp brightness does not adjust	The PCBA is defective	Replace the PCBA.
	The handle assembly is defective	Replace the handle assembly.
The handle becomes very hot to the touch	The lamp has been on for an extended period of time	Return the handle to the cradle.

Note The GS 777 Wall Transformer will accommodate instrument heads of the Welch Allyn approved Halogen and LED type bulbs without any manual adjustment. For information about instrument heads, follow the instructions provided in their directions for use.

Disassembly and repair

These procedures provide instructions for system disassembly and board removal. Except where otherwise noted, the assembly procedure is the reverse of the disassembly procedure.

Each procedure may include the following:

- **Reassembly notes**: This contains information specific to reassembly not addressed in the disassembly instructions.

WARNING Electrical shock hazard. Disconnect power before opening the device.

Caution Before disassembling the device, disconnect the USB power cord and any attached accessories.

Caution Perform all repair procedures at a static-protected station.

Caution When the system case is opened, regard all parts as extremely fragile. Execute all procedure steps with care and precision.

Caution Observe screw torque specifications, especially with screws that secure directly into plastic standoffs.

Caution To avoid mismatching screws and holes, keep the screws for each piece with that piece as you remove modules and circuit assemblies.

Required tools and equipment

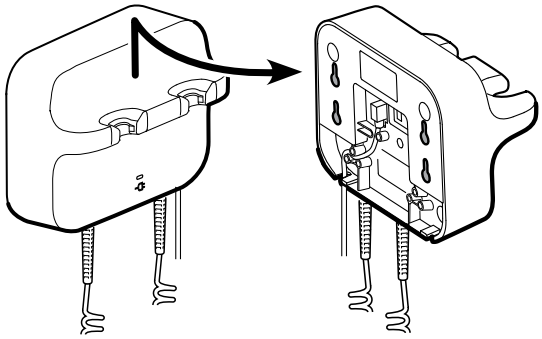
- Screw driver calibrated for 7.5 in-lb ±0.5 in-lb
  - #2 Phillips bit
- Torque driver calibrated for 7.5 in-lb ±0.5 in-lb
  - #10 Torx bit
- Needle-nose pliers

Remove rear housing, handles, circuit board, cradle wire harnesses, and cradles

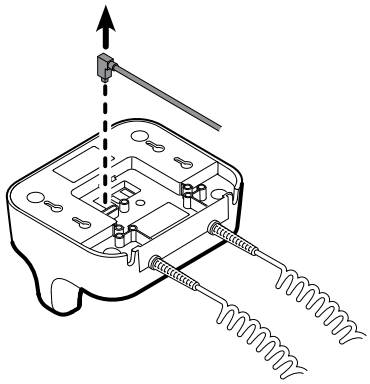
Remove the rear housing

Disconnect the USB power cord and any attached accessories.

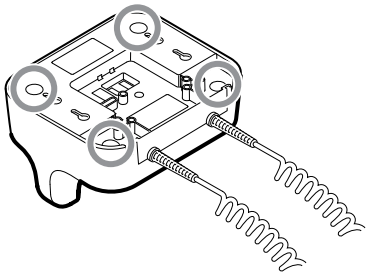
a. Remove the device from the wall.



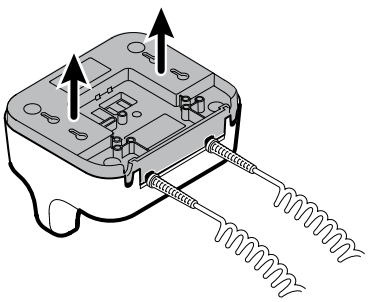
b. Disconnect the USB cable.



c. Remove the rear housing by removing the four large Phillips screws.

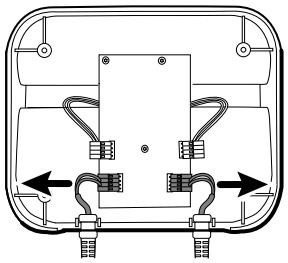


d. Lift and remove the rear housing.



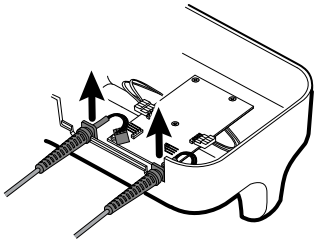
Remove the handles

e. Disconnect the handle connector wires from the PCBA.



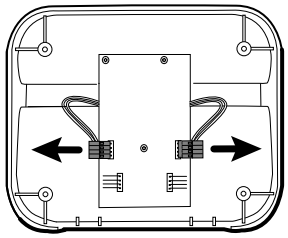
f. Lift and remove the handle cables from the front handle housing.

Reassembly note When reconnecting the handle connection wires to the handle PCBA, the connecting wires must be facing up and away from the PCBA.

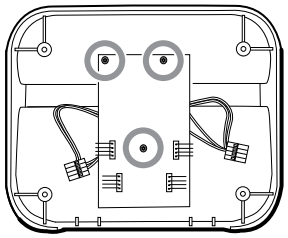


Remove the circuit board

g. Disconnect the two IR wire connectors from the Circuit board.



h. Remove the three torx screws.

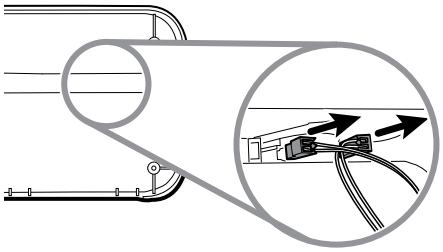


i. Lift and remove the Circuit board.

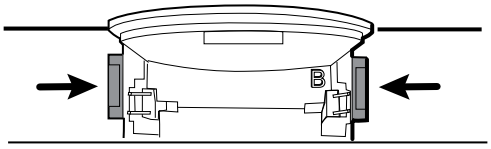
Reassembly note When reconnecting the IR wire connectors to the handle PCBA, the connecting wires must be facing down and toward the cradle assemblies.

Remove the handle cradle and optical assemblies

j. On the rear of the assembly, disconnect both IR wires from the optical sensors.

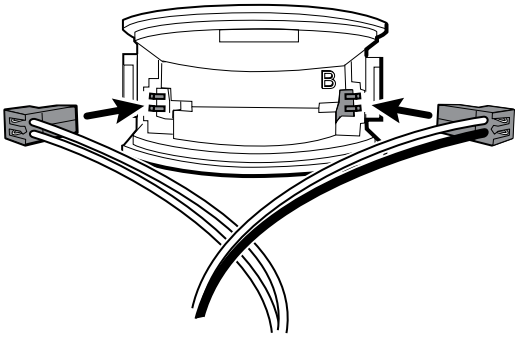


k. Push in the snap tabs and then remove the cradle assembly by pushing outward.

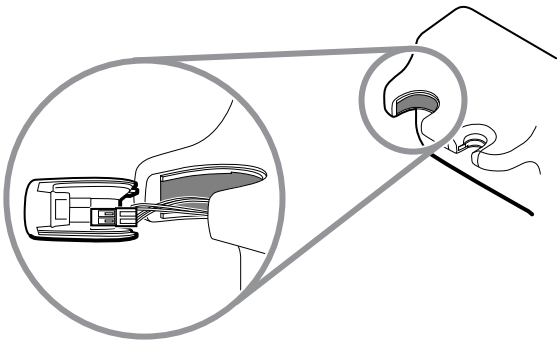


Reassembly note For ease of assembly, connect the IR wire assemblies to the optical sensors before attaching the handle cradle to the handle assembly housing.

- Attach the connector with the black and white wires to the optical detector (indicated by the letter "B" molded into the cradle plastic). Attach the connector with the red and white wires to the optical emitter. The wires should face inward once the handle cradle is assembled.



l. Snap the handle cradle assembly into the front housing. Make sure that the cradle assembly tab and the beveled edge are at the top of the housing.



Functional verification and calibration

Functional verification tests

The functional verification tests help to confirm the proper operation of the device and its options. These tests support the requirements of routine preventive maintenance. It is not necessary to disassemble the device to perform these tests.

The tests may also be useful as a diagnostic tool to help isolate a malfunction.

Verify functionality

To verify functionality:

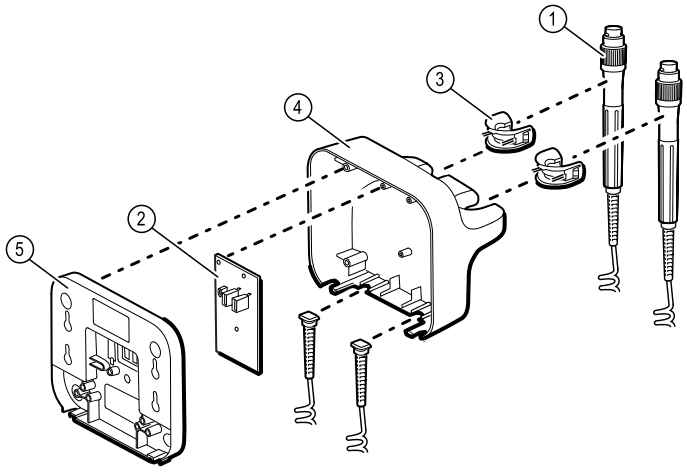
1. Connect power to the device and ensure the power LED indicator is illuminated.
2. Attach a working instrument head to each handle assembly.
3. Remove a handle from the cradle and verify illumination.
4. Test the handle rheostat to ensure illumination adjusts from minimum to maximum output.
5. Return the handle to the cradle.
6. Repeat for the remaining handle.

The instrument heads should automatically turn off when returned to the cradle.

Field replaceable units

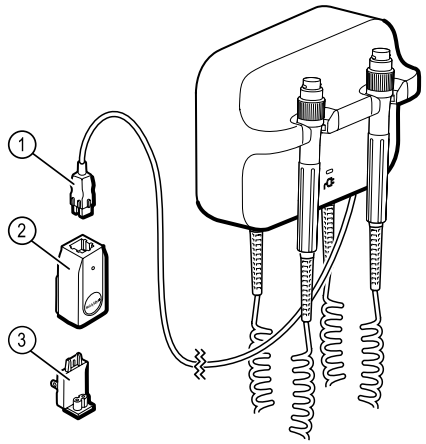
This listing includes only field-replaceable service parts. Product accessories—including 3.5V instrument heads and other consumable items—are listed separately in the accessories list in the device's directions for use, which is available from Welch Allyn Customer Service.

GS 777 Wall Transformer



Kit part numbers

No.	part numbers	Item
1	104299	SK, KIT HANDLE ASSEMBLY
2	408514	PCBA 777 WALL TRANSFORMER
3	105062	SK, ASSY, CRADLE, 2PC BLUE
4	104992	SK, 777 FRONT W/LIGHT PIPE
5	104993	SK, 777 TWIN REAR HSG
(Not Illustrated)	408781	777 WALL MOUNTING KIT
(Not Illustrated)	104281	SK, IR CONNECTOR & WIRE ASSY



No.	part numbers	Item
1	104713	TWIN USB POWER CABLE
2	104996	SK, 5W PLATFORM POWER SUPPLY
3	713263	5W ADAPTER PLUG US
	713264	5W ADAPTER PLUG UK
	713265	5W ADAPTER PLUG EURO
	713266	5W ADAPTER PLUG AUS
	715162	5W ADAPTER PLUG CHINA
	715163	5W ADAPTER PLUG S. AFRICA

Appendices

Decontamination and cleaning requirements

As a general safety precaution, the device must undergo decontamination before being returned to Welch Allyn for service, repair, inspection, or disposal.

Note Contaminated items must not be returned without prior, written agreement.

Note Decontaminate the device according to your facility's procedures and local regulations.

Cleaning is an essential prerequisite for effective disinfection or decontamination.

Note The following guidelines apply to the device only. For peripheral items, follow the cleaning instructions in the directions for use that accompany these accessories.

WARNING Before you clean the GS 777 Wall Transformer, unplug it from the wall socket.

WARNING Electric shock hazard. DO NOT autoclave the GS 777 Wall Transformer or accessories.

WARNING Liquids can damage electronics inside the GS 777 Wall Transformer. Prevent liquids from spilling on or dripping into the GS 777 Wall Transformer. If liquids are spilled on or drip into the GS 777 Wall Transformer:

1. Disconnect the power plug.
2. Remove the GS 777 Wall Transformer from the wall.
3. Dry off excess liquid from the GS 777 Wall Transformer.
4. Mount the GS 777 Wall Transformer on the wall.
5. Verify that the GS 777 Wall Transformer functions normally before using it.

Clean the GS 777 Wall Transformer on a routine basis according to your facilities protocols and standards or local regulations.

To clean the GS 777 Wall Transformer (excluding the instrument heads), use any of the following:

- A clean cloth slightly dampened with 70 percent isopropyl alcohol or 10 percent chlorine bleach solution. Wipe dry with a clean cloth.
- Sani-Cloth® Plus.
- CaviWipes™ (see caution below).

Caution Do not use CaviWipes to clean the blue handle cradles. This cleaning agent produces bubbles and liquid during the cleaning process that can enter openings in the cradles and limit handle performance for as long as 30 minutes after cleaning.

To clean the instrument heads, follow the instructions provided in their directions for use.